

What is claimed is:

1. A surgical device for cutting material and monitoring pressure comprising:
 - 5 an elongate member having a distal region and a proximal region;
 - an energy delivery device associated with the elongate member at the distal region for delivering cutting energy to the material, said energy delivery device adapted for connection to an energy source; and
 - 10 a pressure sensing mechanism associated with the distal region for monitoring pressure about the distal region.
2. The device as claimed in claim 1 wherein the cutting energy is at least one form of energy selected from a group consisting of: electrical current; microwave; ultrasound; and laser.
- 15 3. The device as claimed in claim 2 wherein the electrical current has a frequency within the radio frequency range.
- 20 4. The device as claimed in claim 1 wherein the material comprises cellular tissue and wherein the energy delivery device is operable to deliver sufficient energy to the tissue to result in a rapid increase in the intracellular

temperature causing vaporization of intracellular water and subsequent cell lysis.

5. The device as claimed in claim 1 wherein the pressure sensing mechanism comprises a pressure transmitting lumen
5 extending between the proximal and distal regions, said lumen at the proximal region being adapted for fluid communication with a pressure transducer that provides a signal which varies as a function of pressure and adapted at the distal region for fluid communication with an
10 environment about said distal region.

6. The device as claimed in claim 5 wherein the distal region comprises at least one opening to the environment and wherein the lumen is in fluid communication with the at least one opening.

15 7. The device as claimed in claim 6 wherein the lumen is adapted for injecting a fluid through the at least one opening.

8. The device as claimed in claim 5 wherein the distal region comprises multiple openings to the environment and
20 wherein the lumen is in fluid communication with the multiple openings.

9. The device as claimed in claim 8 wherein at least some of the multiple openings are located distally and some of the multiple openings are located proximally with respect
25 to each other and wherein the some of the openings located

distally are larger than the some of the openings located proximally.

10. The device as claimed in claim 8 wherein the lumen is adapted for injecting a fluid through the multiple
5 openings.

11. The device as claimed in claim 1 wherein the pressure sensing mechanism comprises a pressure transducer on-board the elongate member, said transducer being adapted for communication with a pressure monitoring system.

10 12. The device as claimed in claim 1 wherein the energy delivery device comprises a functional tip with at least one active electrode.

13. The device as claimed in claim 1 wherein the energy delivery device comprises a functional tip having two or
15 more electrodes.

14. The device as claimed in claim 13 wherein the electrodes are configured in an arrangement where at least one of the electrodes is active and at least one is a return electrode.

20 15. The device as claimed in claim 1 comprising at least one depth marking.

16. The device as claimed in claim 1 comprising at least one radiopaque marker.

17. The device as claimed in claim 1 comprising a radiopaque distal region.

18. A method of surgery comprising the steps of:

(i) introducing a surgical device into a body of a patient, the surgical device comprising an elongate member having a distal region and a proximal region, an energy delivery device proximate to the distal region capable of cutting material and a pressure sensing mechanism for determining pressure in the body proximate to the distal region;

5 (ii) positioning the energy delivery device to a first desired location in the patient's body adjacent material to be cut;

10 (iii) delivering energy using the energy delivery device to cut said material; and

15 (iv) measuring pressure in the body using the pressure sensing mechanism in order to determine the position of the surgical device at least one of before and after step (iii).

20 19. The method as claimed in claim 18 wherein step (ii) comprises staining a region of tissue in the first desired location in the patient's body.

20. The method as claimed in claim 18 further comprising a

step of:

(v) advancing the device to a second desired location.

21. The method as claimed in claim 20 wherein the surgical
5 device comprises at least one depth marking and at least
one radiopaque marker and wherein step (v) comprises
monitoring at least one of said depth markings and at least
one of said radiopaque markers.

22. The method as claimed in claim 20 further comprising a
10 step of:

(vi) measuring pressure using the pressure sensing
mechanism at the second location.

23. The method as claimed in claim 22 wherein the surgical
device comprises at least one depth marking and at least
15 one radiopaque marker and wherein step (vi) is performed
after confirming the position of the pressure sensing
mechanism at the second location using at least one of said
depth markings and said radiopaque markers.

24. The method as claimed in claim 18 wherein step (i)
20 comprises introducing the device into the patient's
vasculature.

25. The method as claimed in claim 24 wherein the step of
introducing the device into the patient's vasculature

comprises inserting the device into a dilator and a guiding sheath positioned in the patient's vasculature.

26. The method as in claim 25 wherein the device and at least one of the dilator and sheath comprise a radiopaque 5 marking and wherein step (ii) comprises aligning the radiopaque markings to aid in positioning the device.

27. The method as claimed in claim 25 comprising a step of:

10 (v) advancing the dilator and the sheath into the second location together over the spatially fixed surgical device.

28. The method as claimed in claim 25 comprising a step of:

15 (v) advancing the dilator, sheath and surgical device all together into the second location.

29. The method as claimed in claim 18 wherein the material is tissue located on an atrial septum of a heart.

30. The method as claimed in claim 19 wherein the region of tissue to be stained is a fossa ovalis of a heart.

20 31. The method as claimed in claim 22 wherein the pressure measured at the second location is the blood pressure in the left atrium.

32. An electrosurgical device comprising:

a elongate member having a distal region and a proximal region, said distal region insertable within and along a lumen within a body of a patient and maneuverable therethrough to a desired location where the device is operated to cut material and monitor pressure at the desired location;

5 at least one electrode associated with the distal region for cutting tissue, said at least one electrode adapted for coupling to an electrical power source;

10 and

15 a pressure sensing mechanism associated with the distal region for sensing pressure at the desired location within the body, said mechanism adapted for coupling to a pressure monitoring system.

33. The device as claimed in claim 32 wherein the pressure sensing mechanism is configured to minimize a portion of the elongate member that is necessary to be located at the desired location to monitor pressure.

20 34. The device as claimed in claim 32 wherein the pressure sensing mechanism comprises a pressure transmitting lumen defined within the elongate member extending from the proximal region to and through at least one opening defined in the distal region.

35. The device as claimed in claim 34 wherein said proximal region is adapted for coupling said pressure transmitting lumen to a pressure transducer associated with the pressure monitoring system.

5 36. The device as claimed in claim 34 wherein the pressure transmitting lumen is adapted for at least one of injecting a fluid to or removing a fluid from said body.

10 37. The device as claimed in claim 34 wherein the at least one electrode is coupled to said energy source by a coupling means extending through said pressure transmitting lumen.

15 38. The device as claimed in claim 32 wherein said pressure sensing mechanism comprises an on-board pressure transducer adapted for communicating a transduced pressure signal representative of pressure about the distal region to said pressure monitoring system.

39. The device as claimed in claim 32 wherein the at least one electrode defines a functional tip comprising a conductive and radiopaque material at said distal region.

20 40. The device as claimed in claim 39 wherein the electrical power source is capable of providing a high-frequency electrical power to said functional tip in a high impedance range.

41. The device as claimed in claim 32 wherein the proximal region is adapted to releasably couple said pressure sensing mechanism to said pressure monitoring system.

42. The device as claimed in claim 32 wherein the proximal 5 region is adapted to releasably couple said electrode to said electrical power source.

43. A surgical device comprising:

means for cutting material at a desired location in a body of a patient; and

10 means for determining a position of the device responsive to pressure within the body.

44. The device as claimed in claim 43 comprising a flexible elongate member having a proximal region and a distal region, said distal region adapted for insertion 15 within and along a lumen within the body and maneuverable therethrough to the desired location; and wherein said means for determining a position of the device is operable to determine the position of the distal region.

45. The device as claimed in claim 43 wherein the means 20 for determining a position of the device comprises a pressure transducer for providing a signal representative of pressure to a pressure monitoring system.

46. The device as claimed in claim 45 wherein the means for determining a position of the device comprises a

pressure transmitting lumen defined by the device for coupling to the pressure transducer.

47. The device as claimed in claim 46 comprising a means for injecting fluid to and removing fluid from the body.

5 48. A method of cutting tissue at a desired location in a body of a patient comprising the steps of:

10 inserting a surgical device into the body, said surgical device comprising means for cutting material and means for determining a position of the device responsive to pressure within the body; and

positioning said surgical device at the desired location in response to the means for determining a position of the device.

49. The method as claimed in claim 48 comprising the step
15 of:

cutting material at the desired location.

50. The method as claimed in claim 49 comprising the step of:

20 advancing said device in the body in response to said means for determining a position of the device.

51. The method as claimed in claim 50 comprising re-positioning said device for re-cutting in response to said means for determining a position of the device.